The psychology of energy efficiency labels: Trust, involvement, and attitudes towards Energy Performance Certificates in Ireland

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1. Introduction

Energy Performance Certificates (EPCs) are a widely implemented policy intended to inform building owners, occupiers, tenants, real estate agents and other relevant groups about the energy performance of dwellings (e.g. level of comfort and/or expenditure) and stimulate the investment in energy efficiency of buildings [1]. EPCs for buildings are not a recent concept, for example, in the USA, the "Green Lights" programme was launched in 1999, which later expanded into the "Energy Star Building" programme. To date, all members of the European Union have formally introduced EPCs, although the stage of implementation and the name of the label differs between the various member states. In this paper we focus on EPCs for buildings in Ireland, which stands out as having one of the most well-established and reported databases within the EU [2, 3, 4].

In Ireland, EPCs for buildings are called Building Energy Ratings (BER). Since 2009, by law, all properties for sale or rent in Ireland should complete a BER certification and since 2013 it is mandatory to provide this BER when a property is being advertised for sale or rent. The BER is an energy label that classifies buildings on a scale ranging from A (high energy efficiency) to G (poor energy efficiency). This scale is based on primary energy use under standard conditions for space heating and ventilation, water heating, lighting and associated pumps and fans. A secondary scale shows a CO_2 rating in relation to these same energy uses [5]. Figure 1 indicates how all these aspects are represented on a BER certificate in Ireland.

The general objective of EPCs is to provide consumers with information about the energy consumption and environmental impact of their investment, in order to help them to make a well-informed choice at the point of purchase. They are typically seen as a valuable

communication tool because they can reduce information asymmetry or a so-called consumers' "knowledge gap" by providing this information. Simultaneously, the introduction of EPCs is intended to encourage producers and other market players to increase the environmental standards of their products and services [6]. However, EPCs are often not incorporated in consumers' decisions making process when purchasing or renting a property [7]. This is because the information on EPCs is often complex and other attributes of the property, such as price and location, are more important than energy efficiency in such decision making processes. Also, information may enhance people's knowledge and awareness, but this does not necessarily lead to behaviour change [7, 8]. To illustrate, recent figures show that in Ireland 83% of the population recognise BER labels, whereas only a few indicate that their choice of

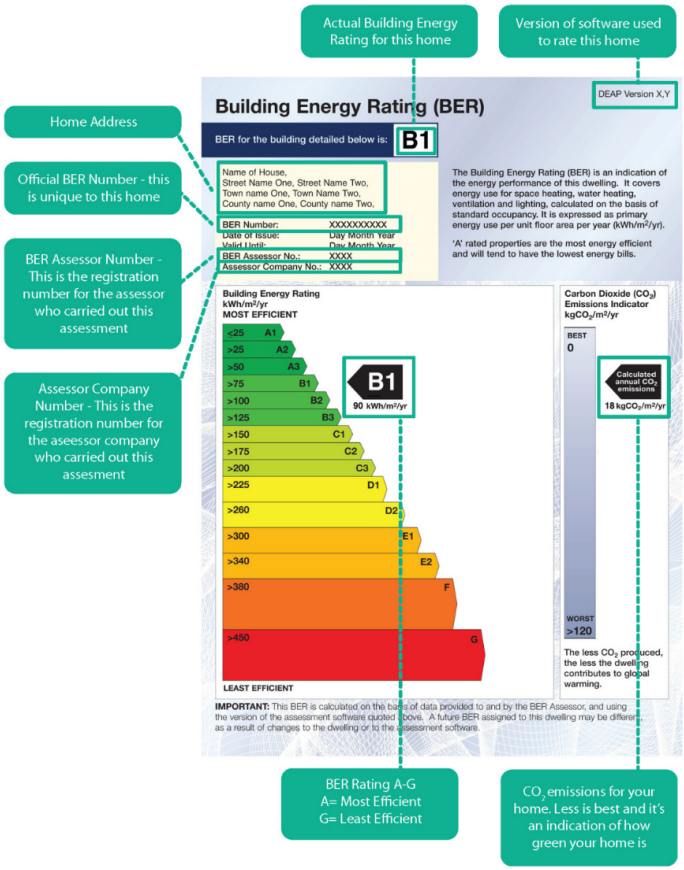

Figure 1. The BER certificate for existing dwellings (Source: SEAI [58]. *Introduction to DEAP for professionals*. Dublin, Republic of Ireland: Sustainable Energy Authority of Ireland).

dwelling is influenced by the BER label (12% renters, 22% buyers) [9]. In addition, only 8.27% of renters in Dublin consider the BER to be an important attribute when renting an apartment when compared to other factors such as the size of the property, area safety, condition, distance to work and cost of the rent [10] and 13% of the renters in Dublin know the BER label of their property [11].

The BER certificate is well established in the Irish property market and energy efficiency is valued by house buyers and renters in Ireland [12]. Properties with higher BER grades command higher sales and rental prices. Similarly, Cajias et al. [13] find an energy efficiency premium in the rental market in Germany. However, in a subsequent paper, Hyland et al. [14] find that there is evidence of 'bunching' of energy efficiency certification on the positive side of letter cut-offs. This implies that buildings are more often rated at the lower rank of a higher letter rather than in the higher end of a lower letter e.g. a bunching of properties with C3 rather than D1 labels. They claim this bunching may be a result of BER assessors attempting to ingratiate themselves with homeowners in an effort to increase repeat business. This 'bunching' may undermine the credibility in the assessors and issuers of BER labels, which may subsequently undermine the trust in BER labels in general. The first aim of this paper is to investigate if and how the credibility of assessors and issuers influences trust in and attitudes to BER labels.

Lack of trust therefore may be one explanation for the discrepancy between recognising and using the information in the BER labels by house buyers and renters [7, 15, 16]. However, the evidence is mixed, as BER labels are valued by house buyers and renters despite bunching practices [12]. This suggests that trust is not the only predicting factor of people's attitudes to BER labels. Trust is often related to involvement in energy efficiency. Some argue that trust is a predictor of involvement [17, 18, 19, 20], whereas others argue involvement is a moderator

[21, 22, 23, 24]. The second aim of this paper is to understand what the role of trust in BER labels and involvement in energy efficiency are in the formation of attitudes to these labels.

2. Theoretical Framework

2.1 Perceived Source Credibility and Trust in BER

There is generally agreement that trust is important for information processing [25, 26, 27]; however, there is no consensus about the exact definition or components of trust. Definitions of trust typically include confidence in or the willingness to rely on others (e.g., another person, a product or an organisation) [28]. In addition, trust is generally seen as a multi-dimensional construct that includes various components, such as competence, fairness and transparency [29, 30]. The *object* of trust in BER labels is, in most studies, the information provided by the label itself [15, 25, 31, 32], and following this, we define trust in BER labels as people's confidence in or willingness to rely on the information provided by these certificates [33].

Atkinson and Rosenthal [34] found that consumers trust a label more if a government issues it rather than when a corporate is the source of the label, implying that the perceived credibility of the source is an underlying reason for trust in energy efficiency labels [15, 34]. Perceived source credibility refers to the extent to which people believe a party has expertise and whether their information can be relied upon [34; 35] [1]. Combining these two dimensions, credible sources of information are third parties, that are seen as competent and reliable [15] , and thus we define perceived source credibility as the perceived expertise and trustworthiness of a source of BER labels [e.g., 36].

In sum, we distinguish between people's *trust in BER labels* – defined as their confidence in or willingness to rely on the information provided by these certificates – and the *perceived*

1 In later research, dimensions related to characteristics of the presentation style or appearance of the source were added (for reviews see Eisend [30]; Pornpitakpan, [32]). However, these dimensions are less relevant when evaluating energy efficiency labels, as they are more related to individual's characteristics rather than to institutions as sources of information.

credibility of the source of BER labels – defined as the perceived expertise and trustworthiness of the source of BER labels. People are more likely to trust in the information provided by a BER label when this is provided by a source that is perceived as credible [34].

The perceived credibility of some sources may influence the trust in energy efficiency labels more than others [35]. In line with this, we argue that in the case of BER labels, the perceived credibility of the parties who are involved in the assessment is particularly important for trust in these labels, which we will refer to as "assessing parties". After all, if those who assess energy efficiency labels are seen as credible, then trust in that label is likely to be high too. In Ireland, there are two parties involved in the BER assessment: the Sustainable Energy Authority of Ireland (SEAI)[2] and BER assessors who do the official assessments of properties[3].

Parties who issue BER assessments, so called "issuing parties", such as house owners, landlords and utilities may use the BER labels for a variety of reasons. For example, house owners and landlords must provide BER labels when they sell or rent their property and it is compulsory to show the property's BER label in the advertisement of the property. They may also use BER labels to obtain information on improving the energy efficiency of their property and in fact many energy efficiency grant schemes in Ireland require a BER assessment as part of the application process. Utilities generally encourage energy efficiency upgrades, as they are obligated to reach energy saving targets according to the Irish National Energy Efficiency Action Plan [33]. Issuing parties such as house owners, landlords and utilities are never involved in the actual assessment of BER labels.

As mentioned above, if those who assess energy efficiency labels are seen as credible, the trust in that label is likely to be high too. In comparison, other parties may use or promote

[2] Sustainable Energy Authority of Ireland (SEAI) is designated by legislation as the governing BER authority. The SEAI sets guidelines on how BER labels are calculated and they register and certify external BER assessors.

[3] Domestic BER assessors need to meet pre-requirements set by the SEAI in terms of training and membership of selected organisations. Further, they must complete SEAI training and pass an exam before being officially registered as a BER assessor.

energy efficiency labels for a variety of reasons, but if they are not involved in the assessment of the labels, the credibility of these sources will be less influential for people's trust in the label. Hence, we hypothesise that (see Figure 2):

Hypothesis 1: Trust in BER labels is high when assessing parties (i.e., authority and assessors) are seen as credible;

Hypothesis 1b: Trust in BER labels is not related to the credibility of issuing parties (i.e., homeowners, landlords, utilities).

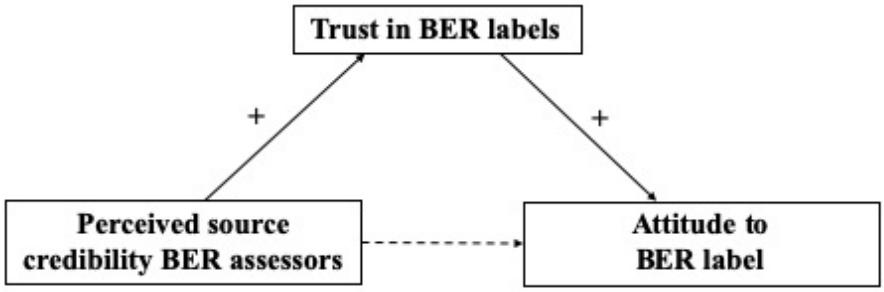

Figure 2. Hypothesised mediation effect of trust in BER labels on the relationship between perceived source credibility and attitudes to BER labels.

2.2 Trust as a mediator between Perceived Source Credibility and Attitudes to BER

It seems reasonable to expect that perceived source credibility not only influences trust, but also influences people's attitudes to energy efficiency labels. Attitudes are defined as a psychological tendency that is expressed by evaluating an entity, such as energy efficiency labels, with some degree of favour or disfavour [37, 38]. In other words, attitudes to energy efficiency labels refers to how positively or negatively people generally think and feel about them.

However, surprisingly, Atkinson and Rosenthal [34] did not find that sources that were seen as more credible led to more positive attitudes towards energy efficiency labels. We think

this may be because there is an *indirect* effect of perceived source credibility on people's attitudes to energy efficiency [39] rather than a *direct* effect. An indirect effect suggests that perceived source credibility influences attitudes via a mediator. Hence, we propose that this mediator is trust in energy efficiency labels, that is, we expect that if assessing parties are seen as credible, people trust in energy efficiency labels more (Hypothesis 1a) and that, in turn, more trust in energy efficiency labels, leads to more positive attitudes to these labels (and vice versa):

> **Hypothesis 2**: Trust in BER labels mediates the influence of the perceived credibility of assessing parties and attitude to BER labels.

2.3 The moderating roles of cognitive and affective involvement

Involvement is defined as a person's perceived relevance of something based on their inherent needs, values and interests [40]. Product involvement refers to the mental effort when making a decision or processing information, and is often used in energy and green labelling or advertising [34, 41, 42]. However, because everybody who is in the process of buying or renting a house is likely to be highly involved in this decision-making process, we focus on a different type of involvement, which is 'issue involvement'. Issue involvement is defined as the extent to which an individual believes an issue is of intrinsic importance or has significant consequences for his or her own life [43]. In our study, this means that high-involved consumers are very involved with the issue 'energy efficiency', whereas low-involved consumers are not.

Involvement consists of two different dimensions, that is, involvement has a cognitive and an affective component [40, 44, 45]. Cognitive involvement stresses an individual's information processing activities and the achievement of idealization states. Cognitive involvement in energy efficiency implies that information about this topic is cognitively processed, and refers to the amount of cognitive effort one requires to process and evaluate this

information. High cognitive involvement (i.e., a large amount of cognitive effort) can lead to either a positive (e.g., energy efficiency is needed, important, and valuable) or negative evaluation (e.g., energy efficiency is not needed, not important, and worthless). Affective involvement stresses a person's feelings and achievements of certain emotional states and is used to describe all emotions, moods and feelings evoked by a certain product. In the case of energy efficiency, affective involvement implies affective responses which can be either positive (e.g., seen as interesting, fascinating, and exciting) or negative (e.g., seen as unexciting, mundane, and boring) and consequently lead to positive or negative evaluations .

Zaichkowsky [44] argues that depending on the object of the study, it may be useful to consider different segments of consumers and investigate whether they are differently involved, i.e., cognitively or affectively, in the topic. Prior research has focused mainly on the cognitive evaluation of energy efficiency labels and far less on the role of affective evaluation. However, energy efficiency may evoke affective responses in people too. For example, some people may feel excited or enthusiastic about the idea of energy efficiency, whereas others may be disinterested in energy efficiency and find it to be a "boring" topic [46, 47]. On a side note, this does not imply that the realised impacts of energy efficiency (e.g., comfort, reduced energy bills, or a certain life style) are not of interest to them. Following Zaichkowsky's [44] argument we believe it may be important to distinguish between cognitive or affective involvement when BER labels are being evaluated, as they may evoke quite different responses.

Involvement is often considered as a moderator, implying that the level of involvement influences how information (e.g., provided by BER labels) influences how much attitudes (e.g., to BER labels) change [21, 22, 23, 24]. This argument is usually based on the idea that high involvement leads to a deep processing of information [24]. If this is the case, strong argument leads to more positive attitudes than weak arguments when people are highly involved. However, when there is low involvement, there is not much difference in how much weak and

strong arguments change attitudes [24]. Involvement is here measured in the most common way, as a unidimensional scale. We argue that its multidimensional character should not be ignored and that cognitive and affective involvement should be treated as distinct moderators, as they are likely to influence attitudes in a very different way. Specifically, we propose that cognitive and affective involvement are distinct moderators for the influence of trust in BER labels on attitudes to these labels.

The implication of strong cognitive involvement in energy efficiency is that people invest effort in cognitively processing that is related to this topic. We assume that trust is a more important factor for people who are high-cognitive involved. That is, if people put a lot of effort into processing information (BER label) that they trust, they are likely to form very positive attitudes. On the other hand, if the information (BER label) is distrusted, very negative attitudes to BER labels are likely to be formed. However, if people are low-cognitive involved, and do not process the information (BER label) deeply, the influence of trust on attitudes is not amplified by the cognitive process, and therefore trust will influence attitudes less strongly. Therefore, we hypothesise that:

> **Hypothesis 3:** Trust in BER labels will have more influence on people's attitudes to BER labels if they are high-cognitively involved as opposed to low-cognitively involved (see also Figure 3).

For affective involvement another effect may be expected. Based on the suggestion that affect is often used as a heuristic, which assumes that people use their feelings and emotions towards an something as a short-cut to form their attitudes and base decisions on [48], we expect that high-affective involvement surpresses the influence of trust information (BER label) on attitudes. A distinct feature of heurisics is that they are fast and frugal, implying that people tend to ignore other sources of information in forming their attitudes [49]. Hence, if people are high-affective involved with the subject of energy efficiency, they are likely to form

their attitudes primarily on their feelings and emotions to the subject (which can be either positive or negative), and ignore other factors, such as their trust in BER labels. However, in comparisson, if people are low-affective involved, their feelings and emotions are not likely to influence their attitudes strongly, and therefore trust in the labels is likely to have a stronger influence on attitudes. Therefore, we expect that trust in BER labels will influence people's attitudes to BER labels more if they are low-affective involved as opposed to high-affectively involved.

Hypothesis 4: Trust in BER labels will have more influence on people's attitudes to BER labels if they are low-affectively involved as opposed to high-affectively involved (see also Figure 3).

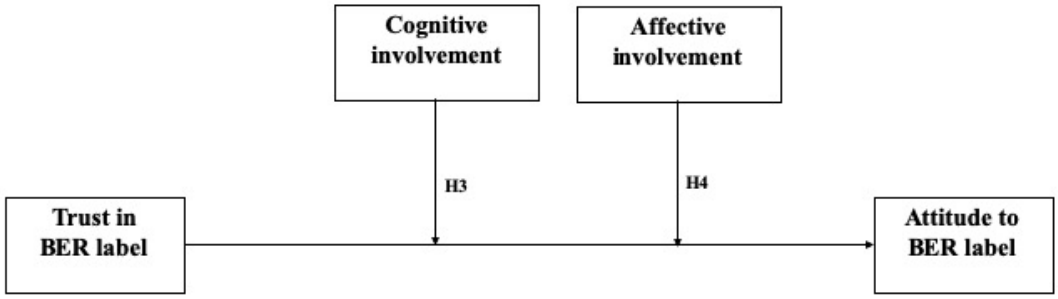

Figure 3. Hypothesised moderation effects of (cognitive and affective) involvement on the relationship between trust in and attitudes to BER labels.

3. Method

3.1 Sample and Procedure

A survey was conducted among a sample of renters in Dublin city (Ireland). We chose to study tenants rather than house owners for this study, as we considered that they were likely to be more familiar with BER labels than owner-occupiers. Since renters typically have much shorter tenancies than owner-occupiers we believe that in general they would be exposed to BER

information in advertisements for property rental more frequently than owner-occupiers. BER certificates are mandatory for both the sale and rental of properties, however, the majority of the literature focuses on house sales rather than rental, thus this paper addresses a gap in the existing literature. Also, we believe trust is an important consideration for renters as their options for investing/improving the property are far more limited than a house purchaser and therefore renters may assess/trust the BER labels differently to homeowners [10].

The data was collected online by a survey company, providing a representative sample. Participants were, at the time of the survey, looking to rent a property or had been looking to rent in the past two years. The data was collected over a period of four weeks in spring 2016. In total, 354 respondents completed the survey. However, 38 respondents were removed from the final analyses because they either did not live in Ireland or filled out the survey in less than five minutes, which is unrealistically fast. As a result, the final sample consisted of 316 participants.

Table 1 shows the summary of the descriptive statistics of our sample; 59.5% were male, and the average age was 30 years old. The data supports the evidence highlighted by [14]: only 24% of our respondents had the BER of the property they have rented available and only 11.7% of them knew the BER of their current property. Finally, the majority were Irish (50%), 3.5% were from the UK, 26% were from other European countries and 21% were from other non-European countries.

According to the Census 2016 [50] the number of people living in rental accommodation in the Dublin area in 2016 was 139,082. Demographic statistics for these people are limited but in 2016 the average age in private rented accommodation was 35, average monthly income was €1650 and 50.2% of renters were male. Thus, our sample is slightly younger, with slightly less income and small over-representative of males in the population of renters in the Dublin area. However, as the correlations between these socio-demographics and the variables in our

model are very small (all correlations ≤ 0.90 or ≥ -.90), we expect does not affect our results. No population statistics are available for the nationality of renters.

Table 1. Descriptive statistics of the sample.

	Frequency
Males	59.5%
Irish renters	49.7%
UK renters	3.5%
EU renters	25.9%
Renters from other countries	20.9%
	Mean
Age	30 years old
Education	Bachelor's degree
Income	€ 1,500/ month
BER available	24.1%
Know BER of their property	11.7%

Note: Eight respondents did not provide information about these questions

3.2 Survey

The survey was designed based on the results of focus groups conducted with renters in Dublin. The attitudinal data presented in this paper were collected in a larger survey that consisted of various sections, including a choice experiment section in which respondents had to choose between different properties that vary in different characteristics, including energy efficiency through BER labelling. In this paper, we will only report the attitudinal part of the survey (see next section for details). However, in the analyses, the experimental conditions of the stated choice experiment were controlled for, to rule out any potential influences or biases on the responses to the attitudinal questions.

3.3 Variables

Perceived source credibility was measured with one item for four different sources. We asked respondents "please indicate how much you trust in …" on a 5-point Likert scale ranging from "do not trust at all (1)" to "completely trust (5)". Two assessors of BER labels were listed, i.e., "the Sustainability Energy Authority of Ireland - the authority implementing BER labels" (M = 3.61; SD = .81) and BER assessors (M = 3.35; SD = .80), as well as two non-assessors of BER labels, i.e., "landlords in general" (M = 2.79; SD =.99) and "your electricity supplier" (M = 3.30; SD = .92).

Trust in BER was measured on a 5-point semantic differential scale (Cronbach's alpha = .93; M = 3.67; SD =.80) which were adapted from Atkinson and Rosenthal [34]. Respondents were asked to indicate "to what extent do you think a BER labels is…" followed by the adjective pairs trustworthy/untrustworthy, inaccurate/ accurate, dishonest/ honest, illegitimate/ legitimate, unreliable/ reliable, and negative/ positive.

Involvement was measured with 10 items forming the Revised Personal Involvement Inventory developed by Zaichkowsky [40, 44]. A 5-point semantic differential scale was used whereby respondents judged "to what extent do you think energy efficiency in dwellings is …" followed by five adjective pairs that focus on cognitive involvement (i.e., important/ unimportant*, relevant/ irrelevant*, means nothing/ means a lot to me, worthless/ valuable, not needed/ needed) and five that focus on affective involvement (boring/ interesting, exciting/ unexciting*, involving/ uninvolving*, appealing/ unappealing*, fascinating/ mundane*). The items marked with an asterisk were mirrored and recoded.

A Principal Component Analysis (PCA) confirmed a two-factor structure of cognitive and affective involvement as proposed in the Revised Personal Involvement Inventory. A varimax rotation was applied to facilitate the interpretation of the results (see Table 2). All five cognitive involvement items have the highest factor loadings on the first factor. Similarly, the

five affective involvement items have the highest factor loadings on the second factor. It should be noted that two items that theoretically belong to "affective involvement" load rather high on both factors. However, as they load highest on the second factor, we assume they fit best there and label this factor "affective involvement". A Principal Component Analysis (PCA) confirmed a two-factor structure as proposed in the introduction (see Section 4.2). Reliability analyses show that both the "cognitive involvement" (Cronbach's alpha = .87; M = 3.89, SD = .89) and "affective involvement" (Cronbach's alpha = .85; M = 3.33, SD = .85) form reliable scales on their own and thus we created 2 separate variables based on them for further analyses, whereby a low score indicated low "cognitive" or "affective" involvement and a high score a high "cognitive" or "affective" involvement.

Table 2. Rotated Component Matrix of Judgements on 10 items of Involvement scale.

Theoretical component	Item	Factor 1	Factor 2
Cognitive	Not needed/ needed	.86	-
Cognitive	Worthless/ valuable	.86	-
Cognitive	Irrelevant/ relevant *	.75	-
Cognitive	Means nothing/ means a lot to me	.74	-
Cognitive	Unimportant/ important*	.67	-
Affective	Mundane/ fascinating*	-	-.89
Affective	Unexciting/ exciting*	-	-.89
Affective	Uninvolving/ involving*	-	-.69
Affective	Unappealing/ appealing*	.56	-.57
Affective	Boring/ interesting	.45	-.56
	Eigenvalue	5.11	1.56
	Explained variance	51.1%	15.7%

* items were mirrored and recoded to facilitate the interpretation of the data
Note: only factor loadings above .40 or below -.40 were reported

Attitudes to BER was measured with two items[4] on a 5-point Likert scale ranging from don't agree at all (1) to agree absolutely (5). The items were "I believe the BER ratings are effective in enhancing the general energy efficiency of properties in Ireland" and "I do

[4] Originally, three items were included, however a third item was removed from the analyses to increase the reliability of the scale.

not support the idea behind BER ratings". The last item was mirrored and recoded for the analyses. The reliability of the scale was acceptable given the small sample size (Cronbach's alpha = .75; M = 3.80, SD = .74).

4. Results

4.1 Relationship between Perceived Source Credibility, Trust and Attitudes

To test our first two hypotheses we used the PROCESS macro (version 2) developed by Hayes [47] to test a simple mediation model (Template 4). Following Hayes [51] we ran this PROCESS model four times. Each time, one out of four independent variables referring to the credibility of issuing parties (Authority (X_1) and Assessors (X_2)) and assessing parties (Landlords (X_3), and Electricity supplier (X_4)) is included as the independent variable in the model, while the other three were included as covariates. Further, we included the mediator Trust in BER (M) and Attitude to BER as dependent variables (Y). Further, as explained in the method section, we control for the experimental condition (C) that the respondents were exposed to in the first part of the survey. Table 3 provides an overview of the results.

In total, the four independent variables (credibility of authority, assessors, landlords, and suppliers) and the control variable (i.e., the experimental condition in the preceding stated choice part of the survey; see Section 3.2) explained 39% of variance in attitudes to BER labels. The results showed that trust in BER labels was higher when respondents believed that the assessing parties (Authorities (a_1 = .37) and Assessors (a_2 = .29)) were a credible source. However, the credibility of issuing parties (Landlords and Suppliers) did not significantly influence respondents' trust in BER labels. This confirms Hypothesis 1.

Table 3. Mediation effect of trust in BER between influence of perceived source credibility on attitude to BER.

		Trust in BER (M)					Attitude to BER (Y)			
Variable		**ß**	**SE**	**p**	**95% CI**		**ß**	**SE**	**P**	**95% CI**
Constant	i_1	1.22	.20	<.001	.84; 1.61	i_2	1.39	.20	<.000	1.00; 1.78
Condition (C)	f_1	-.02	.04	.629	-.11; .06	g_1	.10	.04	.012	.02; .18
Trust (M)		-	-	-	-	b	.24	.53	<.000	.13; .34
Credibility of										
Authority (X_1)	a_1	.37	.05	<.001	.27; .47	c_1	.35	.05	<.000	.25; .47
Assessors (X_2)	a_2	.29	.06	<.001	.18; .41	c_2	.25	.06	<.000	.14; .36
Landlords (X_3)	a_3	-.01	.04	.785	-.09; .07	c_3	-.05	.04	.214	-.13; .03
Suppliers (X_4)	a_4	.07	.05	.189	-.03; .16	c_4	-.01	.05	.812	-.11; .08
		F (5, 311) = 40.45, p<.001; R^2 = .39					F (6, 310) = 30.02, p<.001; R^2 = .37			
							ß	**SE**	**P**	**95% CI**
					Direct effects	c'_1	.26	.05	<.000	.16; .36
						c'_2	.18	.06	.002	.70: .30
						c'_3	-.05	.04	.226	-.13; .30
						c'_4	-.03	.05	.568	-.12; .07

The right column of Table 3 shows that trust in BER labels had a positive effect on attitudes to BER labels, that is, the higher the trust, the more positive attitudes were to BER labels (b =.24), thereby confirming Hypothesis 2. Further, if assessing parties were seen as a credible source, the attitude to BER labels was more positive too (Authorities c_1 = .35 and Assessors c_2 = .25, respectively), whereas there was no significant relationship between the perceived credibility of issuing parties. We hypothesised that trust in BER labels would mediate the relationship between perceived source credibility (of BER authorities and attitudes) (Hypothesis 2, see also Figure 2). Hence, one would expect that the direct effects (c'_1 and c'_2) would be lower than the total effects of the independent variables on attitudes to BER (c_1 and c_2). Indeed, the direct effects are lower than the total effects (Δ = .09 and Δ = .07 respectively), which confirms that trust is a mediator. However, as the direct effects remain significant, we conclude that there is only a partial mediation effect.

4.2 Cognitive and Affective Involvement as Moderators

We used Hayes' [51] PROCESS macro (version 3, template 2) to test whether cognitive involvement and affective involvement separately were moderators of the relationship between trust in BER labels and people's attitudes to them. In this model we controlled for the experimental condition respondents were in (see Table 4).

The overall model explains 32% of variance in attitudes to BER labels. We found a significant main effect for trust: the higher the trust in the BER label, the more positive the attitudes to them (ß = .38). Also, a positive and significant main effect for cognitive involvement was observed: the stronger the cognitive involvement in energy efficiency, the more positive were attitudes to BER labels (ß = .12). Affective involvement did not significantly contribute to the explanation of variance in attitudes.

Further, the two interaction effects significantly contributed to the explanation of the model. Both cognitive and affective involvement were significant moderators of the relationship between trust in BER labels and people's attitudes to them (ß = .19 and ß = -.17, respectively). We analysed the details of these interaction effects via simple slope analyses, which are illustrated in Figures 4 and 5.

Table 4. Moderation effect of cognitive and affective involvement on the relationships between trust in BER and attitudes to BER

Variable	**ß**	**t**	**p**	**95% CI**	
Constant	3.56	38.17	<.001	3.39; 3.72	F (6, 311) = 24.49, p<.001;
Condition	.01	2.36	.019	.02; .18	R^2 = .32
Trust	.38	7.40	<.001	.28; .48	
Cognitive Involvement	.12	2.13	.021	-.02; .23	
Affective Involvement	.09	1.60	.110	-.02; .19	
Trust * Cognitive Involvement	.19	3.35	.007	.08; .29	ΔF (2, 311) = 6.12, p=.002;
Trust * Affective Involvement	-.17	-2.73	.001	-.29; -.05	ΔR^2 = .03

Figure 4 illustrates the interaction effects of cognitive involvement and trust on attitudes to BER. For those with high-cognitive involvement (1 SD above the mean) in energy efficiency, trust in BER labels has a stronger influence on their attitudes to BER labels (ß = .51, t (317) = 7.43, p<.001) than for people with low-cognitive involvement (1 SD below the mean) in energy efficiency (ß = .31, t (317) = 4.57, p<.001), which confirms our expectations that high-cognitive involvement might work as an amplifier when trust is high (Hypothesis 3).

The interaction effect of affective involvement and trust on attitudes to BER labels shows opposite effects (see Figure 5). When affective involvement in energy efficiency is high, trust levels have less of an influence on attitudes to BER labels (ß = .38, t (317) = 5.67, p<.001) than when affective involvement is low (ß = .49, t (317) = 7.37, p<.001). This supports our suggestion that affective involvement is used as a heuristic when forming attitudes to BER labels (Hypothesis 4).

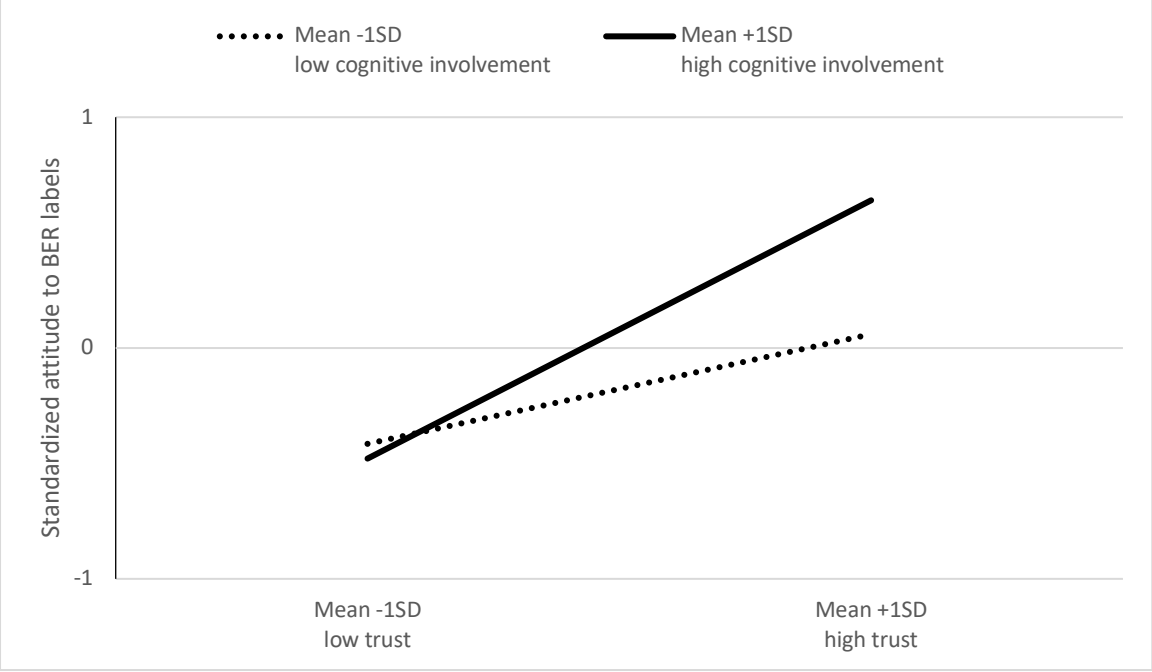

Figure 4. Interaction effect of cognitive involvement and trust on attitudes to BER labels

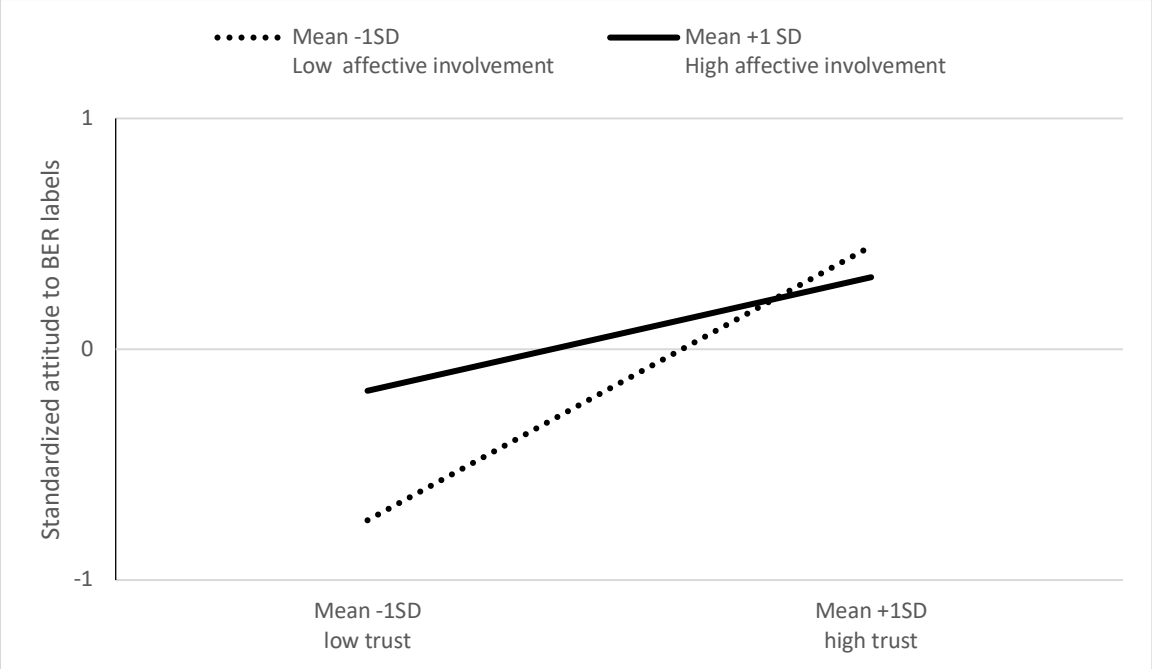

Figure 5. Interaction effect of affective involvement and trust on attitudes to BER labels

5. Discussion

The key contribution of this paper is twofold. Firstly, we investigated how the credibility of sources of BER labels influence people's trust in and attitudes to such certificates. Secondly, we investigated the role of trust in the formation of attitudes to BER labels in Ireland. Specifically we focussed on how cognitive and affective involvement moderate the effect of trust in BER labels on attitudes to them. We found that distinguishing between cognitive and affective involvement is very important, as they showed a very different moderation effect.

Generally, trust is recognized as an important factor that influences people's responses to energy efficiency labels, and our results confirm this. We found that trust in BER labels was higher when renters believed those involved in assessing BER labels (i.e., relevant authorities and assessors) were credible (Hypothesis 1). In addition, the credibility of the involved assessors influence attitudes to BER labels both directly, and indirectly via trust in BER labels (implying a partial mediation effect). Hence, authorities and assessors must improve their credibility to enhance trust in BER labels, which is subsequently likely to result in more

positive attitudes to these labels. Improving credibility may for example be achieved by making the assessment process of energy efficiency of a building more transparent [52, 53] or by building stronger relationships between companies and customers [17].

Our main theoretical contribution is that we show how important it is to distinguish between cognitive and affective involvement, and not treat involvement as a unidimensional construct [45]. We showed this in the context of trust and attitudes to BER labels, but this may be relevant in many other contexts as well and it is worth investigating. Our results show that there are different mechanisms at work. When trust in information is high, high-cognitive involvement seems to amplify its effect on attitudes, that is, high tust and high involvement lead to very positive atitudes, whereas low trust and high involvement leads to very negative attitudes. Trust also influences people's attitudes when their cognitive involvement is low, but this effect is much smaller.

For affective involvement, another effect is observed: when people are high-affective involved, trust has a smaller effect on attitudes than when they are low-affective involved. We suggest that in this case, affective is used as a heuristic, and therefore trust as another factor that might influence attitudes is ignored to a certain extend. In other words, if people *feel* strongly involved in energy efficiency, which can be either positively or negatively, their trust in BER labels does not influence their attitudes as strongly as when they do not strongly feel involved in energy efficiency. Thus, we propose that the influence of trust is suppressed when affective involvement is used as a heuristic.

Finally, it is important to note that one limitation of this study is that we investigated specifically people's attitudes, without measuring their behaviour, that is, in retrospect it would have been useful to include measurements on whether attitudes would have led to the uptake of more energy efficient properties among renters or a higher willingness to pay for building with a higher energy efficiency label? Also, the causal relationships we proposed were bases

on theoretical arguments, however, given our correlational data we cannot be confirmative about these causal relationships. Future research could aim to validate our findings experimentally. Despite these limitation, we believe our results have important theoretical and policy implications. We argue that it can be theoretically very important to understand the influence of cognitive and affective involvement separately on attitudes to EPCs, as they moderate the effect of trust on attitudes in different ways. It is important to disentangling these effects in order to avoid the misrepresentation of results and, subsequently, misinforming policy makers. Moreover, it may provide a basis for how people may think positively about BER labels despite low levels of trust. In addition, it contributes to the field by increasing strategies to 'socialise' energy policy [54] and provides a greater understanding of the mechanisms governing behaviour change [55], both of which are identified as critical challenges facing social science research in energy.

6. Conclusions and policy implications

Ensuring people trust BER labels is key, as lack of trust in BER labels is a common reason for buyers and tenants of properties to pay relatively little attention to their energy efficiency label [7, 15]. Our study shows that ensuring the credibility of the assessing parties of such EPCs is one way to ensure trust in them, but there are other ways to do so too. We also find that the influence that trust has on people's attitudes towards BER labels depends on their cognitive and affective involvement in energy efficiency. By ignoring these two dimensions of involvement and treating it as a unidimensional construct, which is often the case, important nuances may be lost and lead to sub-optimal policies.

Currently, all policies are aimed at engaging people cognitively in energy efficiency, and all focus primarily on providing information. We showed that this is very effective to enhance attitudes to BER labels when there is trust in these certificates. However, engaging people

cognitively when they do not trust BER labels has an opposite effect, and leads to very negative attitudes. This implies that it is very important to focus strongly on securing trust in information when a policy aims to increase cognitive involvement. However, if trust is low, involving people cognitively is likely to backfire, and one might look for alternative ways to involve people in energy efficiency.

Our results provide an alternative strategy to engage people in energy efficiency when trust in information is low, that is engaging people via affective appeals [cf. 56)], thereby targeting their emotions, feelings and moods. Increasing affective involvement in this field could be by done by trying to enhance people's 'excitement' and 'interest' in energy efficiency, which include efforts to make the design of the label more 'appealing' (see also [57, 58]). Such strategies are commonly used in messages on climate change (e.g., 59, 60, 61] and may be applied to the field of energy efficiency as well.

In conclusion, trust is crucial to ensure positive attitudes to BER labels, and therefore policies should aim to maintain or enhance trust. However, the role of trust on attitudes differs, as it is influenced by cognitive and affective involvement. Our results suggest that policy strategies could engage people via cognitive and affective routes separately. If trust levels are high, policies focussing on increasing cognitive involvement in energy efficiency, like most currently policies do, are likely to be effective in enhancing attitudes to BER labels. However, if BER labels are not trusted, policy makers are advised to focus on strategies that increase people's affective involvement with energy efficiency to enhance attitudes to them.

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